

# ACU202R01



## Agilis Control Unit (Outdoor Quad Band LNB Controller)

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# Chapter 1 Product Overview

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Agilis, a global leader in the design, development and manufacturing of quality satellite products for various applications, introduces the Agilis ACU Series Agilis Control Unit.

The ACU Series Agilis Control Unit is designed to provide a complete monitor and control solution for outdoor Low Noise Block (LNB) applications.

This user manual provides detailed information to system integrators and end users on how to set-up, operate and maintain the ACU Series Agilis Control Unit.

## *1.1 About the ACU Series Agilis Control Unit*

---

The Agilis Control Unit (ACU) is a high performance, cost-effective VSAT equipment designed for satellite communication with high speed transmission capability suitable for both telephony and high speed data communication.

The ACU can be operated with different modulation formats like BPSK, QPSK and FM. The Agilis Control Unit is suitable for the following applications:

- Single Carrier Per Channel (SCPC)
- Multi-Carrier Per Channel (MCPC)
- Demand Assigned Multiple Access (DAMA)
- Time Division Multiple Access (TDMA)

The ACU is designed for outdoor environment operating conditions, with Ntype (F) and Mil-Specs connectors.

## 1.2 ACU Functions

This section explains the design and functions of the Agilis Control Unit.

### 1.2.1 ACU Functional Block Diagram

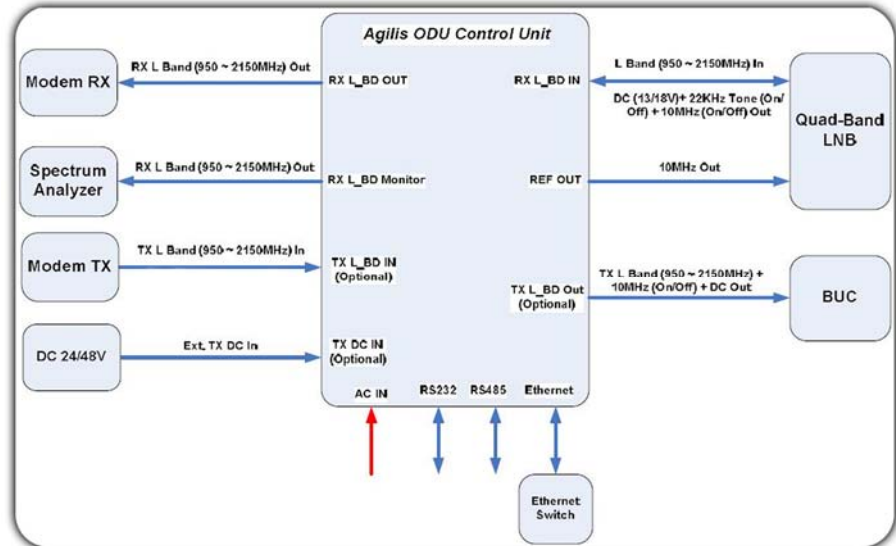


Figure 1.1 Agilis Control Unit Functional Block Diagram

### 1.2.2 ACU Functions

The main function of the ACU is to provide complete monitoring and control functions to outdoor LNBs.

The ACU functions include:

- Provides a +13/+18 VDC supply for the LNB.
- Provides a 22 kHz tone for the LNB operation.
- Provides a 10MHz reference for the LNB through a very stable built-in stable 10 MHz OCXO.
- Monitor and control

The M&C module is the central processing hub of the ACU. It is developed on an embedded microcontroller to perform the required monitoring and control functions. The unit can be connected to a remote PC via serial communication using RS485 or through optional Ethernet connection. Using the M&C module, you can:

- Configure the unit's operating parameters.
- Monitor the unit's operating parameters.
- Check alarm status.



### 1.2.3 Receive Path

On the receive path, the Modem Rx is connected to the “Rx L-BD OUT” port and the LNB connected to the “Rx L-BD IN” port. The OCU will provide DC (13 / 18V), 10 MHz REF and 22 KHz tone to the LNB.

When using the SMW LNB, the OCU will provide selectable DC (OFF / 13 / 18VDC) and 22 KHz (on / off) and multiplex them onto the “Rx L- BD IN” port. The OCU will provide a 10MHz REF signal on the “REF OUT” port which will be connected to the SMW LNB.

When using the Agilis LNB, the OCU will provide selectable DC (OFF / 13 / 18VDC) and 10 MHz (on / off) and multiplex them onto the “Rx L-BD IN” port. If the Modem internal 10 MHz reference source is enabled, the OCU will filter off this 10 MHz reference source from the modem. The OCU will also provide a “Rx L-BD OUT MON” port to monitor the receive signal.

### 1.2.4 Transmit Path (Optional)

On the transmit path, the modem Tx is connected to the “Tx L-BD IN” port and the BUC connected to the “Tx L-BD OUT” port. The DC for the BUC is provided either by the modem on the transmit cable or by the External DC source on the “TX DC IN” port. The OCU allows both L-band signal and DC to be transmitted to the BUC. If the BUC does not require external DC to power up, the OCU will allow the user to block any DC on the “Tx L-BD OUT” port.

### 1.2.5 LED Status Display

The OCU shall provide visual status indications for the following parameters:

- Power Supply
- Tx Status
  - DC (Off / Modem / Ext.)
  - 10 MHz (On / Off)
- Rx Status
  - DC (Off / 13V / 18V)
  - 10 MHz (On / Off)
  - 22 KHz (On / Off)
  - LNB Status

The OCU shall provide selectable DC, 22 KHz tone and 10 MHz REF via Ethernet M&C.

### 1.2.6 SUPPLY VOLTAGE OPTIONS

The ACU unit derives its voltage supply through the separate AC connector.

- AC Input: Voltage range is 110 ~ 240 VAC @ 50/60 Hz

## 1.3 ACU Interfaces

### 1.3.1 ACU Front View

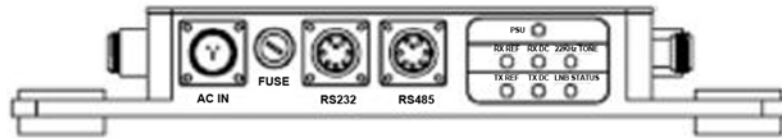


Figure 1.2 Front view of the ACU unit

Table 1-1 Interfaces present on the front of the ACU Unit

Port Reference	Connector Type	Signal Details
AC IN	3-pin, plug KPT02E12-3P	AC IN is the primary AC power supply input which provides an AC supply for built-in power supply (250W AC-DC converter).
FUSE	-	5A AC-250V fuse inside for the AC1 IN power supply.
RS232	8-pin square flange KPT02E12-8S	Provides an RS232 interface for an indoor DTE (usually a PC) to monitor and control the ACU operation.
RS485	8-pin square flange KPT02E12-8S	Provides an RS485 interface for an indoor DTE (usually a PC) to monitor and control the ACU operation.

#### LED STATUS INDICATORS

LED	Condition	LED Color
PSU	Power ON	GREEN
RX REF	10MHz Power ON	GREEN
TX REF	Tx Ref OFF	RED
	Tx Ref ON	GREEN
RX DC	“0V” Set	LED OFF
	“+13V” Set	GREEN
	“+18V” Set	BLUE
22KHz TONE	22KHz Tone OFF	RED
	22KHz Tone ON	GREEN
TX DC	(w/o TX DC)	LED OFF
LNB STATUS	LNB connected and RX DC ON	GREEN

The following tables provide the pin-out details of the M&C connectors.

Table 1-2 Pin-out configuration for RS485 connector

	Pin	Function
Serial	Pin B	Ground
	Pin E	RS485-
	Pin F	RS485+
	Pin A	Reserved
	Pin C	Reserved
	Pin G	Reserved
	Pin H	Reserved
	Pin D	Reserved

Table 1-3 Pin-out configuration for RS232 connector

	Pin	Function
Serial	Pin B	Ground
	Pin E	RS232-RX
	Pin F	RS232-TX
	Pin A	Reserved
	Pin C	Reserved
	Pin G	Reserved
	Pin H	Reserved
	Pin D	Reserved

### 1.3.2 ACU Right Side View

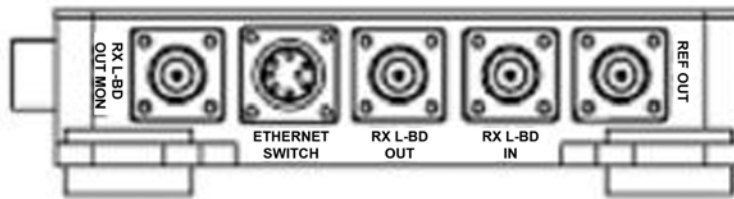


Figure 1.3 Right side view of the ACU unit

Table 1-4 Interfaces present on the right side of the ACU unit

Port Reference	Connector Type	Signal Details
RX L-BD OUT MON	50 $\Omega$ female N-type connector	L-Band output coupled signal for monitoring.
ETHERNET SWITCH	8-pin square flange KPT02E12-8S	Provides an Ethernet interface for an indoor DTE (usually a PC) to monitor and control the ACU operation.
RX L-BD OUT	50 $\Omega$ female N-type connector	Connects to the indoor unit (modem).
RX L-BD IN	50 $\Omega$ female N-type connector	Connects to the LNB and provides the LNB with DC power and 22KHz tone.
REF OUT	50 $\Omega$ female N-type connector	Provides 10MHz reference signal.

Table 1-5 Pin-out configuration for Ethernet Switch connector

	Pin	Function
	Pin A	Reserved
	Pin D	Reserved
	Pin F	Reserved
	Pin H	Reserved
Ethernet	Pin G	TX+
	Pin E	TX-
	Pin C	RX+
	Pin B	RX-

1.3.3 ACU Left Side View

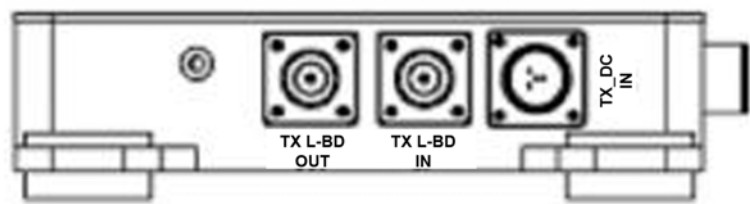


Figure 1.4 Left side view of the ACU unit

Table 1-6 Interfaces present on the left side of the ACU unit

Port Reference	Connector Type	Signal Details
TX L-BD OUT (Optional)	Dummy Plate	Not Used
TX L-BD IN (Optional)	Dummy Plate	Not Used
TX DC IN (Optional)	Dummy Plate	Not Used

1.4 Product Models

This manual is suitable for the ACU models:

Table 1-7 Product series models

Model Type	Model #
ACU Series Outdoor LNB Control Unit	ACU202R01

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## Chapter 2 System Configurations

This chapter explains, in detail, the system in which the ACU is deployed in and its various components.

### 2.1 Types of System Configurations

The ACU can be deployed in a Standalone System Configuration. The Standalone System Configurations is explained in the details below.

#### 2.1.1 LNB Standalone System Configuration using ACU

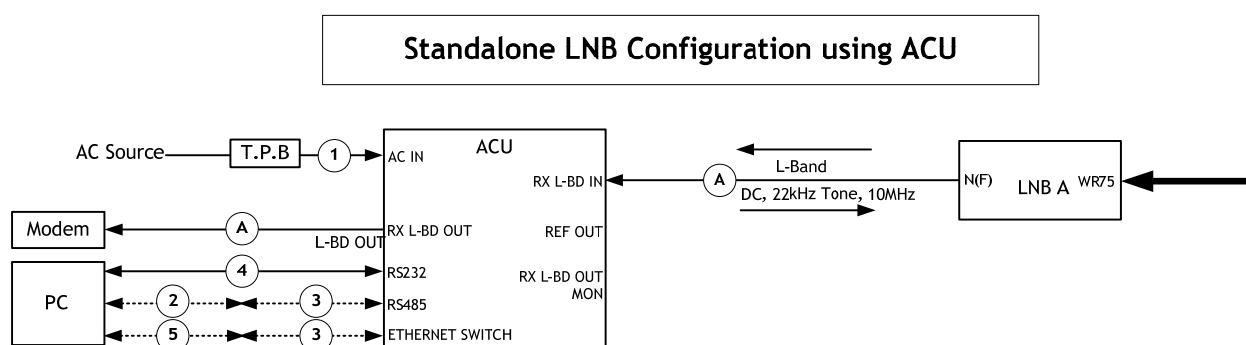



Figure 2.1 Standalone LNB Configuration Setup using ACU

The table below lists the accessories and components required to setup the Standalone LNB System. This setup diagram and table can also be found at the back of this manual for your convenience.

Table 2-1 List of accessories and components for LNB redundant system

Item No.	Agilis Part No.	Description	Length (m)	Quantity
1	1001520980	AC Power Cable with Transient Protection Box	2	1
2	6103480008	Converter RS485 to USB	-	1
3	2502040699	C/A M&C RS485 (optional)	-	1
4	2502040500	C/A M&C RS232	-	1
5	2502041166	C/A M&C DB9 to ETH RJ45 (optional)		
A	-	RF Cable (L-Band)	To be arranged by customer	
-	ACU202R01	Agilis Control Unit	-	1

Item No.	Agilis Part No.	Description	Length (m)	Quantity
-	-	QUAD-BAND LNB	-	1

 **Note:** The table above is a typical accessories list for the Standalone LNB System. Depending on your purchase order, your Standalone LNB System package may not include certain optional cables. Please contact Agilis if you wish to purchase any of the above accessories.

## 2.2 System Components

This section explains the various system components, aside from the ACU, that are required to setup the entire system.

### 2.2.1 Low Noise Block (LNB)

LNBs are mounted near the reflector dish. Wide bands of frequency signals are fed into the LNB which then amplifies and converts these signals to minimize signal loss.

Agilis' LNB devices are specially designed for satellite earth station receiver front ends and other applications.

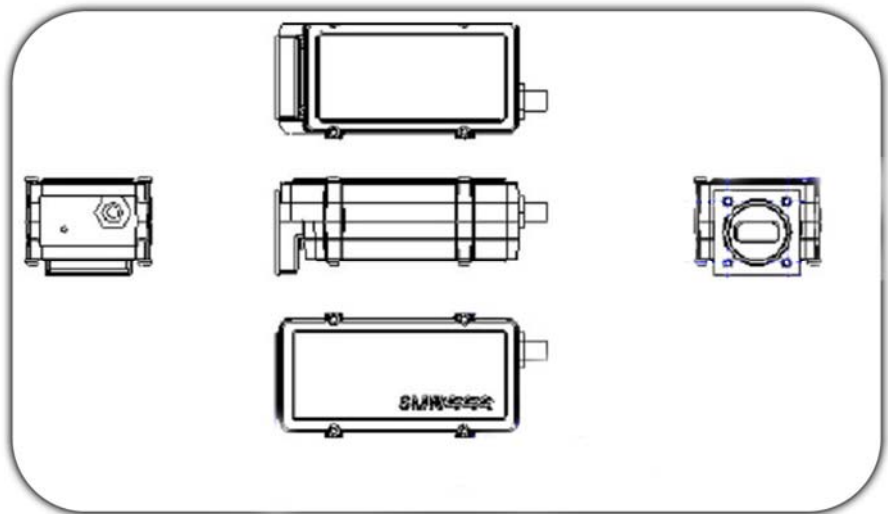


Figure 2.2 Low Noise Block (LNB)



## 2.2.2 Transient Protection Box

Transient protection prevents spikes in electrical discharges that may cause damage to your Agilis equipment or other connected components. A TPB is connected to AC input ports of your Agilis equipment.

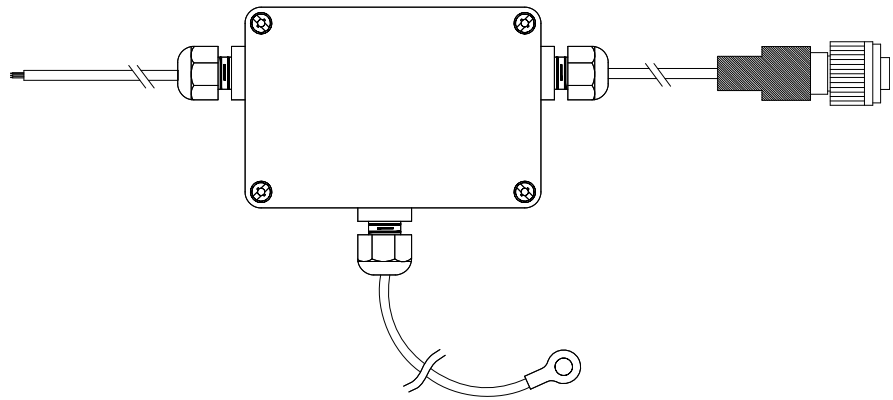



Figure 2.3 Transient Protection Box

For the TPB to work effectively, please keep clean outgoing lines away from the incoming or earth leads.

 Note: Ground the TPB by connecting the M6 Earth Stud to a grounding rod. Note that this is vital to the proper operation of the TPB.

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## Chapter 3 Installation

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This chapter explains a step-by-step process to safely mount and install your Agilis products.



**WARNING:** Always handle the ACU with care. Dropping or knocking it may cause damage to the unit. Agilis' warranty does not extend to defects due to excessive shock or vibration.

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### 3.1 *Unpacking the Box*

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Before unpacking the box, check if it had been damaged or opened. If the shipment may have been tempered with, open the box in front of a representative from the shipping company.

Upon opening the box, carefully remove the items in the package and check them against the packing list. If any of the items are damaged or missing, please contact Agilis or your local Agilis representative before proceeding.

We recommend that you keep the original packing materials until you have completed the checks and confirmed that the unit is in working order.

If you need to repack the product for shipping, please use the original shipping container and packing materials whenever possible. Alternatively, you may also use high quality commercial packing materials to repack the unit. Please seal the container firmly and clearly mark "FRAGILE Electronic Equipment" on the exterior.

## 3.2 Pre-Installation Preparations

### 3.2.1 Environmental Considerations

The Outdoor unit's aluminium chassis is coated with white, enamelled epoxy for environmental protection. All interface connectors are sealed to prevent air and moisture from entering the unit.

According to the instructions supplied by the antenna manufacturer, locate and install the antenna in an area that is free from RF interference from motors and electronic equipment. A clear line of sight from the antenna to the satellite is essential. To ensure safety and protection of personnel and equipment, lightning arresters should also be used at the site. Size 3/0 or 4/0 stranded copper wire should be used to bond the ACU and LNB to the antenna frame and to the lightning protection ground rod. The grounding resistance of the antenna should not be more than 10  $\Omega$ .

Before proceeding with the mounting process, please ensure that the environmental conditions in the area where the ACU is to be mounted is appropriate for its optimal operation. These include:

- Temperature: -40°C to +60°C
- Relative Humidity: Up to 100% Weather protection sealed to IP65

### 3.2.2 Tools Required

We highly recommend having the following tools on hand before starting the installation:

- 1 complete set of socket wrench
- 1 Philips head screwdriver
- 1 cutter
- 1 bag of cable ties (long and medium length)
- 1 multi-meter

### 3.2.3 Site Preparation Checklist

The following table provides a checklist to help you ensure that your site is adequately equipped to perform the installation.

Checklist Item	Y/N
Equipment required for site survey	<input type="checkbox"/> Inclinator <input type="checkbox"/> Compass / DataScope <input type="checkbox"/> 1-meter rectangular bar <input type="checkbox"/> Scientific calculator <input type="checkbox"/> 100-meter measuring tape <input type="checkbox"/> Site location map <input type="checkbox"/> GPS receiver <input type="checkbox"/> Road distance wheel <input type="checkbox"/> Vernier calliper <input type="checkbox"/> Location markers / flags
Is site in the satellite footprint?	<input type="checkbox"/> Yes <input type="checkbox"/> No


Checklist Item	Y/N
Approximate length of cables between ODU and IDU	
IF cable routing method	<input type="checkbox"/> Underground <input type="checkbox"/> Surface
Is there a clear path for cables from ODU to IDU?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Proposed mounting location	<input type="checkbox"/> Antenna structure <input type="checkbox"/> Near the antenna <input type="checkbox"/> Inside the shelter <input type="checkbox"/> Other: _____
Does the mounting location provide the best route for cables from IDU to ODU to antenna?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is there an unobstructed view from the satellite(s) of interest?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are there any hazards near the site location that may damage or obstruct the ODU? (old buildings, trees, planned future construction)	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, please specify: _____
Are there possible RF interference from other nearby telecommunication towers?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Will your installation cause interference to other nearby setup?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is sufficient power supply available?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is grounding available?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Is the site prone to the following?	<input type="checkbox"/> Heavy wind <input type="checkbox"/> Heavy rainfall <input type="checkbox"/> Ice/snow accumulation <input type="checkbox"/> Extreme temperatures <input type="checkbox"/> Sand/Dust storms <input type="checkbox"/> Others: _____

### 3.2.4 Power Supply

#### SELECTING AN APPROPRIATE AC POWER SOURCE

When selecting the AC power source to connect your indoor and outdoor units, please ensure that the voltages are within the limits specified in the table below. You are recommended to use an Automatic Voltage Regulator if your power source falls outside of these limitations.

Tolerance	X VAC, where X is the AC requirement of the device
Live – Neutral	230 VAC $\pm$ 15%
Live – Earth	230 VAC $\pm$ 15%
Neutral – Earth	< 5 VAC


 Note: The equipment may be damaged if the Neutral – Earth tolerance exceeds 5VAC. Please check your grounding setup if this occurs.

### 3.2.5 Pre-Installation Test

Performing a pre-installation test prior to the actual field installation helps you to:

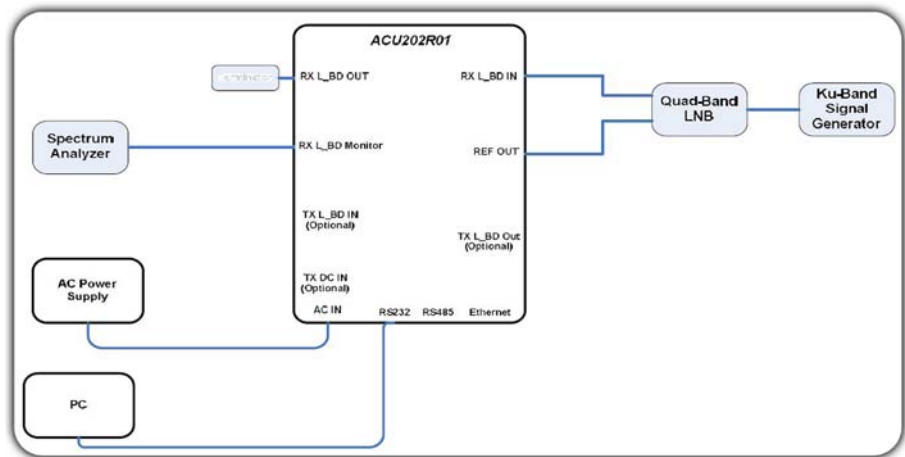
- Confirm that the unit has not been damaged during shipment.
- Check that the unit is in working order before performing a tiring and costly mounting procedure on your antenna.

The downlink test procedure is recommended for the ODU ACU System.

 **Note:** Ensure that no alarm or fault appears on the ACU before performing any test.

#### DOWNLINK TEST PROCEDURE

Step 1 Connect the ACU as shown in the figure below and power up the system.



Step 2 Use the Ku band signal generator to input a Ku-Band pure carrier to Quad-band LNB. Adjust the RF output power to -60dBm.

Step 3 Measure L band Signal level at the “Rx L-band Out Mon.” port by a spectrum analyzer. Calculate the receive gain by subtracting the input power from the output power plus the amount of attenuation included in this link. Compare the gain obtained with the specifications of LNB. If there is no signal, check if the channel setting is correct.

Example:

$$\begin{aligned}
 \text{Rx gain} &= \text{IF OUT power} - \text{RF IN power} + \text{Attenuation Set} \\
 &= -10 - (-60) + 0 \\
 &= 50 \text{ dB}
 \end{aligned}$$

### 3.2.6 Sealing

To complete an installation, seal up all the connectors and waveguide joints of the system using self-amalgamating tape. It is recommended that all “sealing job” be done after the system has been verified to be operational. The following points should be taken care of:

- Step 1 Make sure that all the connectors are hand-tightened before sealing.
- Step 2 The sealing must cover from the housing of the ACU until after the heatshrink sleeve. Refer the Figure 3.1 for the sealing.
- Step 3 All the unused connectors must be covered with a cap and sealed.
- Step 4 Make sure all waveguide joints are properly sealed with an appropriate gasket.

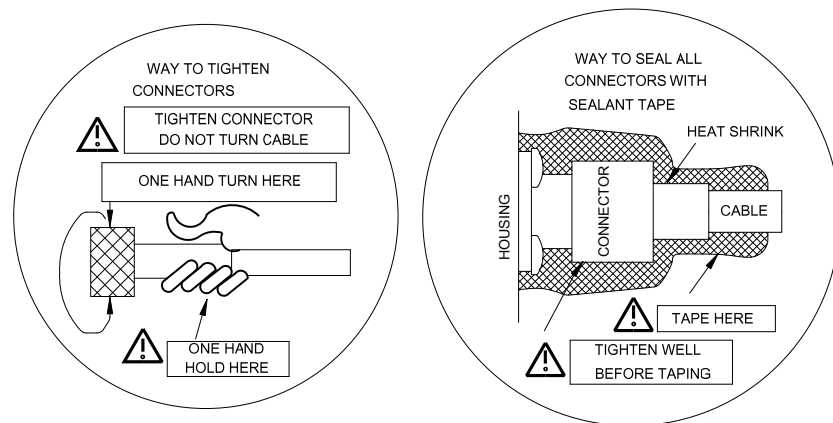


Figure 3.1 Sealing the connectors

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# Chapter 4 Setup and Management

## 4.1 Monitor & Control

The ACU can be monitored and controlled remotely via the OMC500 v1.0.0 software.

This chapter provides information about the monitor and control specifications of the ACU.

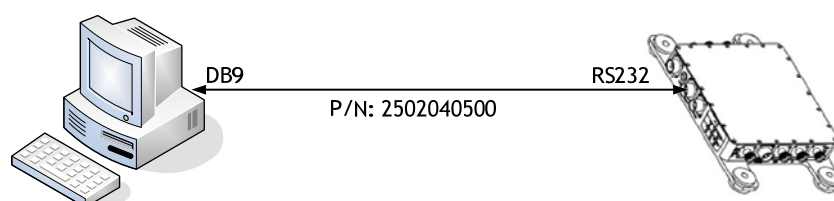


Figure 4.1 Connecting the ACU to the PC via RS232 serial connection

## 4.2 Monitor & Control Specifications

The tables below lists down the Monitor and Control parameters of the ACU.

SERIAL-INTERFACE		
Test Parameter	Value / Specification	Remarks
GUI Software	OMC500 v1.0.0	This software will provide the GUI to monitor and control OCU using Serial Interface
RS232 PORT		
Baud rate of RS232 communication	9600	
LED display on GUI	Same as LED display on Unit	It will follow the layout the LED display on the front-panel on the physical unit
RS485 - TCP/IP BRIDGE		
TCIP/UART Baud rate in OMC500	9600	
Default Host IP	192.168.1.3 and port = 9761	

The Agilis OMC500 software allows you to monitor and control the ACU and LNB parameters via serial communication. This package comes in an executable file that can be launched once the ACU has been physically connected to the PC using either a RS232 cable or a RS485 cable. Refer to [Figure 2.1 Standalone LNB Configuration Setup using the ACU](#) for the cable details.

To launch the Agilis OMC Software package, unzip the .zip file that is included in your system purchase. Double-click the "OMC500\_v1.0.0.P.exe" to launch the monitor and control software.

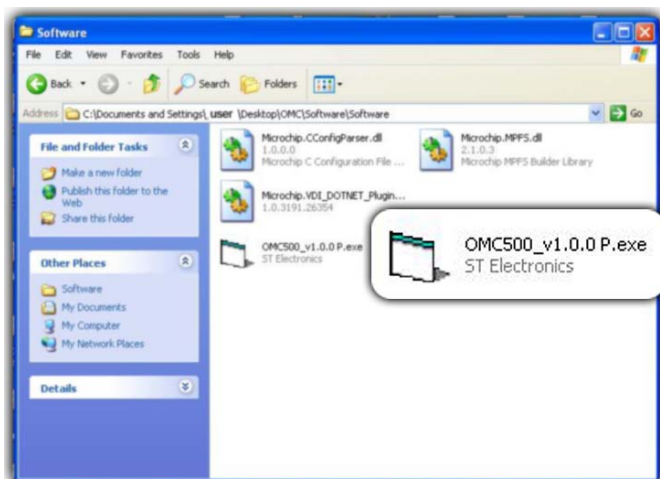


Figure 4.2 OMC500\_v1.0.0.P.exe

Once the OMC500 Software is successfully launched, you will see the interface where you can monitor and control the parameters of the ACU. The correct COM Port of the ACU must be entered on the "COM:" textbox to enable the PC to communicate with the ACU.

The graphical user interface consists of buttons, drop-downs, textboxes, and graphical displays that show the parameters of the ACU that can be viewed and/or configured.

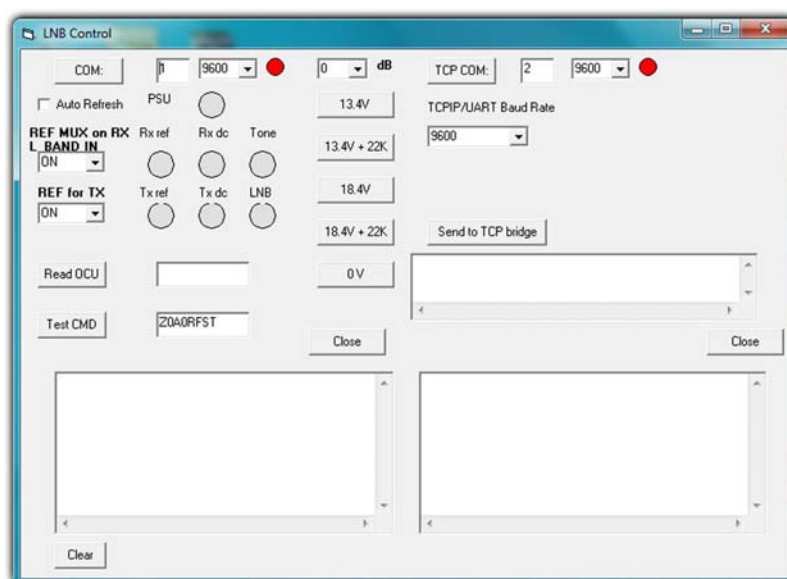


Figure 4.3 OMC500 Graphical User Interface

Shown below are several parameters of the ACU that can be configured using the OMC500.

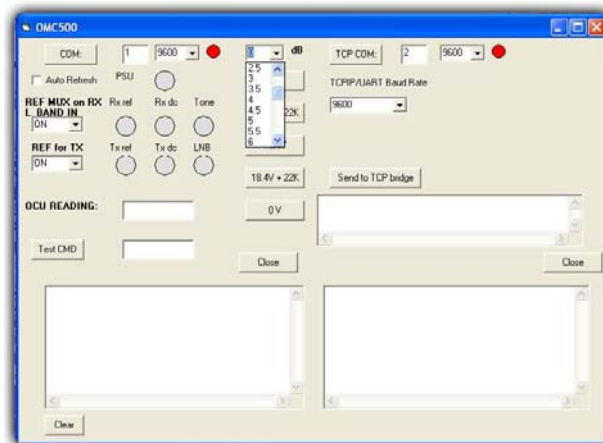


Figure 4.4 Attenuation Adjustment

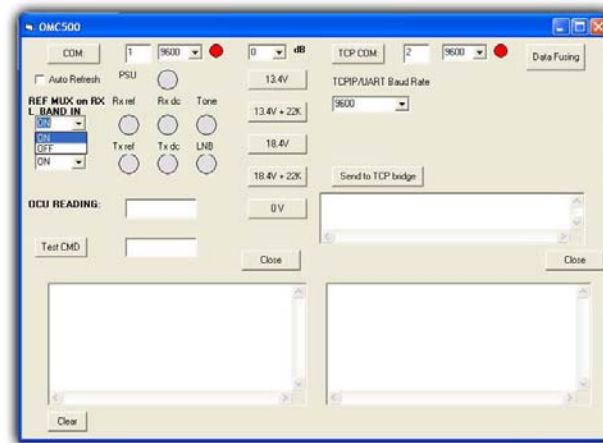


Figure 4.5 L BAND IN ON/OFF

If the ACU is not connected or the incorrect COM port has been entered on the textbox, an error message will pop-up on the screen. Refer to the figure shown below.

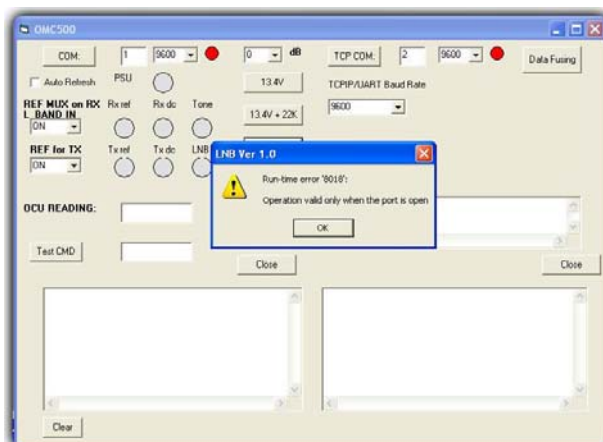


Figure 4.6 ACU operation error

The tables below lists down the Monitor and Control parameters of the ACU.

MONITOR & CONTROL		
Test Parameter	Value / Specification	Remarks
DEVICE INFORMATION		
Host IP (TCP/IP Bridge)	Default = 192.168.1.3 and port = 9761	The default IP and port setting for TCP/IP bridge on the serial interface
Device ID	DEFAULT = 01	Identifies the device on RS485 serial interface
Part Number	15 Characters	
Serial Number	16 Characters	
Firmware Version	4 Characters	
DEVICE CONFIGURATION		
LNB Output Voltage = 13 V Tone = None	Rx DC LED = Green 22 KHz LED = Red LNB L.O = 9.75GHz	
LNB Output Voltage = 13 V Tone = 22K	Rx DC LED = Green 22 KHz LED = Green LNB L.O = 10.0GHz	
LNB Output Voltage = 18 V Tone = None	Rx DC LED = Blue 22 KHz LED = Red LNB L.O = 11.05GHz	
LNB Output Voltage = 18 V Tone = 22K	Rx DC LED = Blue 22 KHz LED = Green LNB L.O = 10.5GHz	
LNB Output Voltage = 0 V Tone = None	Rx DC = Off 22 KHz = Red LNB status = Red	
Rx Attenuation	0 to 15 dB in 0.5 dB step	The supported RX attenuation range and step size
Power-Cycle the device.	The device is powered-back with the last configured state	
DEVICE STATUS		

MONITOR & CONTROL		
Test Parameter	Value / Specification	Remarks
Tx Reference ON/OFF Status	On / Off	This would indicate the presence or absence of TX Reference signal

Rx MUX Ref ON/OFF Status	On / Off	This would indicate the presence or absence of RX Reference on the MUX
LNB ON/OFF Status	On / Off	This would indicate the status of LNB
LNB Status	OK / Alarm	This would indicate the health of the LNB
Tx Reference Status	OK / Alarm	This would indicate the health of the TX Reference
Rx Reference Status	OK / Alarm	This would indicate the health of the RX Reference

SNMP-INTERFACE		
Test Parameter	Value / Specification	Remarks
SYSTEM INFO		
01. System Description (sysDescr)	Agilis Outdoor Control Unit	Read-Write
02. System Uptime (sysUpTime)		Read-Only
03. System Contact (sysContact)	Customer-Service +65-65217959	Read-Write
04. System Name (sysName)	ACUX Outdoor Control Unit	Read-Write
05. System Location (sysLocation)	ST Electronics, Singapore	Read-Write
DEVICE INFO		
06. Manager IP (managerIP)	Default = 192.168.1.10	Read-Write
07. Device IP (deviceIP)	Default = 192.168.1.3	Read-Write
08. Device ID (deviceId)	Default = 01	Read-Write
09. Part Number (partNo)	15 Characters	Read-Only
10. Serial Number (serialNo)	16 Characters	Read-Only
11. Firmware Version (firmwareVersion)	4 Characters	Read-Only
DEVICE STATUS		
12. Tx DC ON / OFF Status (tx_DCOut_Status)	NA	Read-Only
13. Tx Reference ON / OFF Status (tx_REFOut_Status)	On / Off	Read-Only
14. Rx MUX Ref ON / OFF Status (rx_MUXREFOut_Status)	On / Off	Read-Only
15. LNB ON / OFF Status (lnb_Out_Status)	On / Off	Read-Only

DEVICE ALARM		
16. LNB Status (Inb_Alarm)	OK / Alarm	Read-Only
17. Tx DC Status (tx_DC_Alarm)	N.A	Read-Only
18. Tx Reference Status (tx_REF_Alarm)	OK / Alarm	Read-Only
19. Rx Reference Status (rx_REF_Alarm)	OK / Alarm	Read-Only
DEVICE CONFIGURATION		
20. Tx Reference ON/OFF (tx_REF_Switch)	On / Off	Read-Write
21. Rx Reference ON/OFF (rx_REF_Switch)	On / Off	Read-Write
22. Rx Attenuation (rx_Atten)	0 to 15 dB in 0.5 dB step	Read-Write
23. LNB Output Tone (Inb_Out_Tone)	Enable / Disable	Read-Write
24. LNB Output Voltage (Inb_Out_Voltage)	13V / 18V	Read-Write

WEB-INTERFACE		
Test Parameter	Value / Specification	Remarks
DEVICE INFORMATION		
01. Part Number	ACU202R01	
02. Serial Number		
03. Firmware Version		
NETWORK INFORMATION		
04. Device ID	Default = 01	
05. Device IP	Default = 192.168.1.3	
06. SNMP Manager IP	Default = 192.168.1.10	
DEVICE STATUS		
07. Tx DC Ouput	NA	
08. Tx Reference Output	On / Off	
09. Rx Reference Output	On / Off	
10. LNB Voltage	13V or 18V	
11. LNB Tone	On / Off	
12. Rx Attenuation	0 to 15 dB in 0.5 dB step	
13. LNB Output	On / Off	
DEVICE ALARM		
14. LNB Status	OK / Alarm	

15. Tx DC Status	NA	
16. Tx Reference Status	OK / Alarm	
17. Rx Reference Status	OK / Alarm	
<b>DEVICE CONFIGURATION</b>		
18. Login ID	“admin”	
19. Login Password	“sttest ”	
20. Verify whether user control functions are blocked with ANY OTHER password	ID = Guest; Password = Guest	
21. Device IP	Default = 192.168.1.3	
<b>WEB-INTERFACE</b>		
Test Parameter	Value / Specification	Remarks
22. Device ID	Default = 01	
23. SNMP Manager IP	Default = 192.168.1.10	
24. Tx Reference ON / OFF	On / Off	
25. Rx MUX Reference ON/OFF	On / Off	
26. Rx Attenuation	0 to 15 dB in 0.5 dB step	
27. LNB Output Voltage	13V or 18V or 0 V	
28. LNB Output Tone	On / Off	
25. Power-Cycle the device	Verify that the device is powered-back with the last configured state	
<b>SNMP CONFIGURATION</b>		
28. Read Comm1:	Default = Public	
29. Read Comm2:	Default = Read	
30. Read Comm3:	Default = Blank	
31. Write Comm1:	Default = Private	
32. Read Comm1:	Default = Write	
33. Read Comm1:	Default = Public	

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# Chapter 5 Maintenance

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This chapter details various system maintenance operations to help ensure that your system works under optimal conditions.



**WARNING:** Disconnect all power sources before performing any system maintenance and repair.

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## 5.1 Preventive Maintenance

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This section explains the various maintenance checks that should be routinely carried out to ensure that the system is working correctly and in optimal condition.

Ideally, you should perform a complete maintenance on the system at least twice a year and record all updates and changes made to each ODU “SETUP RECORD”. Notify all users that may be affected of a system down time of roughly two hours prior to maintenance.



**WARNING:** Disconnect and re-connect cables during maintenance properly to avoid causing any damage to the cables that may result in intermittent problems in the future.

Connect the output interface of the equipment to a proper load.

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## 5.2 Maintenance Procedure

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### 5.2.1 Receive Gain Testing

The following procedure is to be carried out to check the receive gain.

Step 1 Ensure that all the IF and RF cables are labelled.

Step 2 Make sure that all the cables are in good condition using the mega ohm meter. Ensure that the cables are removed at both ends before the measurements are taken. Check visually if the connectors are not damaged.



**WARNING:** Cable connection and disconnection should be done properly to avoid damage to the cables or connectors that may cause intermittent problems in the future.

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- Step 3 Measure the ground resistance of the antenna with a mega ohm meter. The reading should not be more than 100ohms.
- Step 4 Check if the receive configuration of the LNB and ACU configuration comply with the SET-UP RECORD. Contact the responsible personnel in case of any discrepancies.
- Step 5 Turn on the pure carrier of the signal generator and measure the power level using a spectrum analyzer.
- Step 6 Connect the Ku-band signal to the LNB. Turn on the ACU and measure the power level of the pure carrier at the port of "Rx L-BD OUT MON." on the ACU. Calculate the receive gain and check if it is close to that at the SET-UP RECORD.

### 5.2.2 Water Leakage Protection

All the connectors at the outdoor should be properly sealed against water leakage using self-amalgamating tapes. The following is the procedure for the maintenance.

- Step 1 Make sure all the connectors are hand-tightened before sealing.
- Step 2 Check and ensure that all the connectors and waveguide joints of the system are properly sealed using self-amalgamating tape. Re-do the sealing if the existing sealing is not good
- Step 3 The sealing must cover from the housing of the ACU until after the heatshrink sleeve at the cables.
- Step 4 All the unused connectors must be covered with caps and sealed.

### 5.2.3 Completing the Maintenance

Make sure everything including the equipment settings is normalized after the maintenance. Make sure that the SET-UP RECORD is updated for any changes made to the configuration.

Completing each maintenance service requires the following actions:

- Check the sealing on existing connections and re-seal if necessary.
- Tighten and re-seal all connections and important joints that were disconnected for maintenance.
- Check and ensure that all waveguide joints are properly equipped with a gasket and sealed.
- Cover all unused connectors with a cap and seal.
- Update the SETUP RECORD.

## Appendix A Customer Service

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Agilis provides a variety of after-sales services. This chapter explains some of the services offered including warranty information, the Return Material Authorization process, parts replacement etc.

### *A.1 Warranty Information*

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If the unit fails due to defects in materials or workmanship, Agilis will, at its sole discretion, repair or replace the defective parts, free of charge, within two years from the date of its shipment from the Agilis production factory.

Note that shipping cost to Agilis will not be covered under this warranty guarantee.

This warranty will be voided, freeing Agilis from any liability or obligation to the Purchaser with respect to the product in the following situations:

- The product has been damaged during shipment
- Failure caused by products not supplied by Agilis or its authorized contractors and agents.
- Failure caused by operation of the product outside of its published electrical and environmental specifications or any causes other than ordinary use.
- Water ingress due to improper installation.

## A.2 Return Material Authorization (RMA)

### PRE-RMA CHECKLIST

Shipping the unit to and from your supplier or the factory for repair is a costly and time consuming procedure that may cause disruption in your system for a prolonged period of time. Hence, please inspect your system thoroughly using the checklist below to help us determine if return shipping is necessary.

Table A-1 Pre-RMA Request Checklist

Please check		
Product model / serial no:		
When did the unit fail:	<input type="checkbox"/> Initial startup <input type="checkbox"/> Unit worked normally before failure	
Initial Fault Symptom:		
Consistent or intermittent fault	<input type="checkbox"/> Consistent <input type="checkbox"/> Intermittent	
Duration of operation before the failure		
Are fans working normally?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Is the airflow path blocked?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
10 MHz Ref. level at failure		
IF input level at failure		
Output power at failure		
LED status		
Is the device and setup properly grounded?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Weather conditions just before failure	Air Temperature: _____ Heavy rain/snowfall/storms: _____	
AC Potential	Live – Neutral	
	Live – Ground	
	Neutral – Ground	
AC-DC converter working status		
Is the primary power source working and free of power spikes?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Was there any recent power outages that affected the device?	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Please check	
Are connectors properly sealed and free from debris/water?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Replace the device with a working one (if available) and check if the system works.	<input type="checkbox"/> Works with the new device <input type="checkbox"/> Does not work with the new device
Detail the diagnosis performed that localized the fault to the unit as the point of failure	

If you need to return the devices or any components to Agilis for repair, please contact Agilis to obtain a Return Material Authorization (RMA) number by filling in our RMA Request form. You can obtain this form via our website at [www.agilissatcom.com](http://www.agilissatcom.com). Once you receive a RMA number, carefully repack the unit and attach this number to the unit to be shipped to Agilis.

Agilis provides repair services for products under or out of warranty.

### *A.3 Additional Technical Support*

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If you require further technical support, please contact Agilis using the contact information below:

Address: ST Electronics (Satcom & Sensor Systems) Pte Ltd.  
No. 29 New Industrial Road,  
ST Electronics Paya Lebar Building  
Singapore 536213

Service Hotline: (+65) 6521 7959

Fax: (+65) 6521 7333

Email: [techsvc\\_satcoms@stee.stengg.com](mailto:techsvc_satcoms@stee.stengg.com)

You can also visit [www.agilissatcom.com](http://www.agilissatcom.com) for the addresses and contact information of our regional service centres.

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## Appendix B Unit Specifications & Outline

### B.1 Low Noise Block Specifications

Table B-1 Quad Band Ku-Band LNB Specifications

Characteristic	Specification			
Frequency Band (GHz) (RF Input)	Band 1	Band 2	Band 3	Band 4
	10.7-10.95	10.95-11.7	11.7-12.25	12.25-12.75
LO Frequency	9.75GHz	10.00GHz	10.75GHz	11.30GHz
IF Frequency (MHz)	950-1200	950-1700	950-1500	950-1450
DC Power	13V	13V/22KHz Tone	18V	18V/22KHz Tone
Input Interface	WR-75			
Output Connector	N-type female 50 Ohms			
Gain	55 dB			
Output P1dB	+15dBm			
Noise Figure	0.8dBm			
DC Current	350mA			
LO Phase Noise	@1KHz	-73dBc/Hz		
	@10KHz	-78dBc/Hz		
	@100KHz	-100dBc/Hz		
	@1MHz	-110dBc/Hz		
Mechanical Specifications	Dimensions	140x70x44 (LxWxH)		
	Weight	300g		
	Operating Temperature	-30 - +60°C		
	Storage Temperature	-40 - +80°C		

## B.2 Unit Outline Drawings

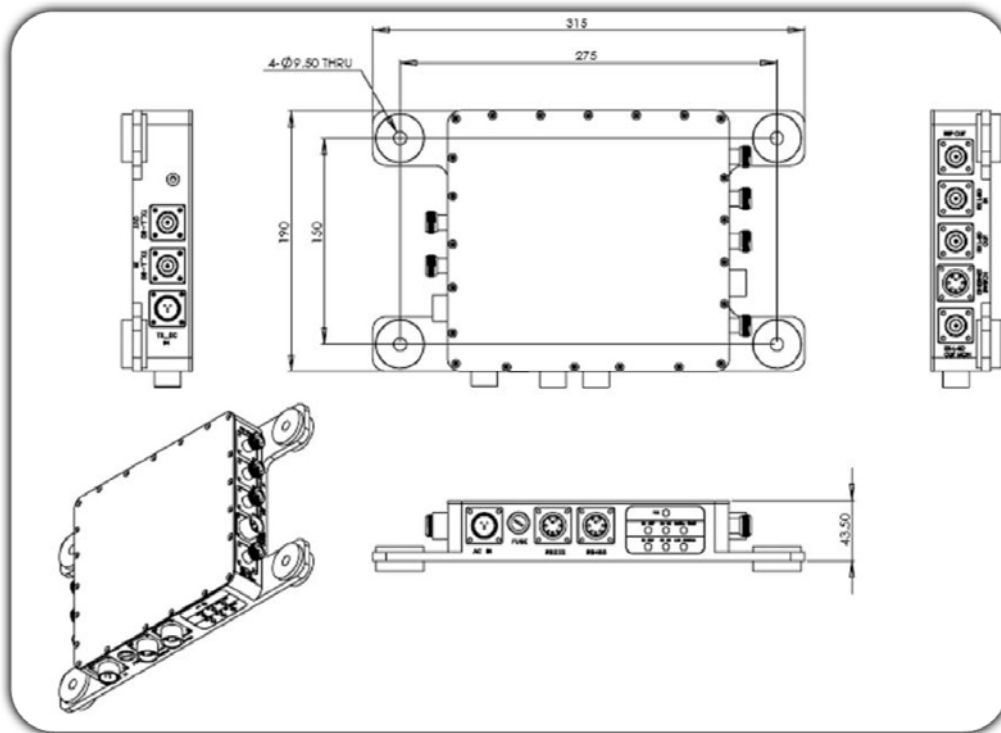


Figure B-1 ACU Outline Drawing

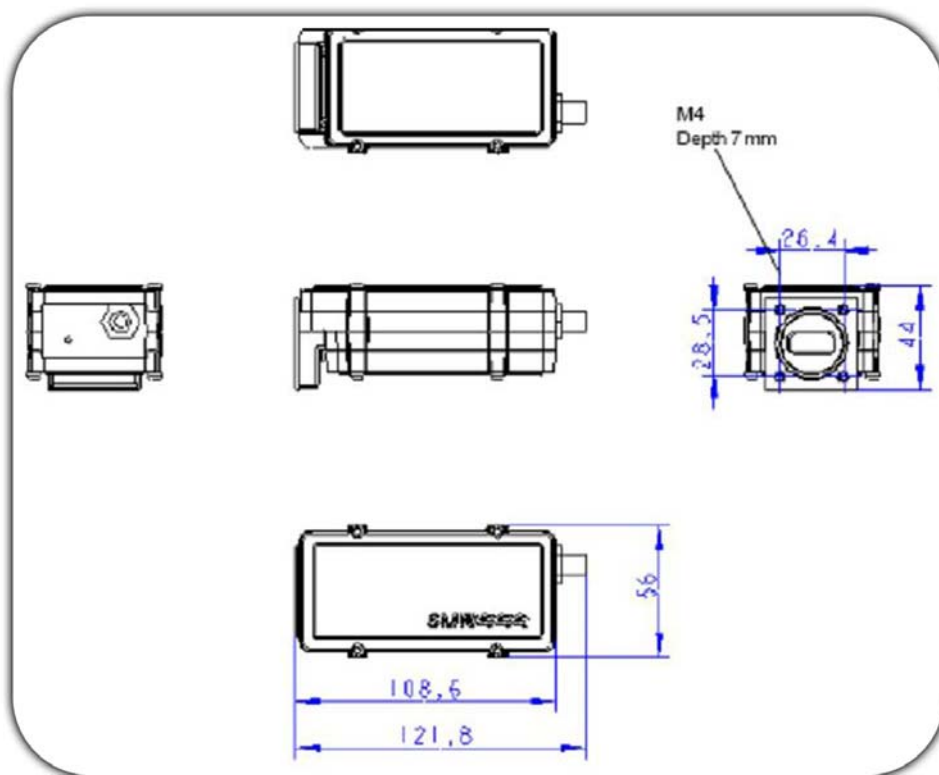


Figure B-2 LNB drawing



## Appendix C Compliance Standards

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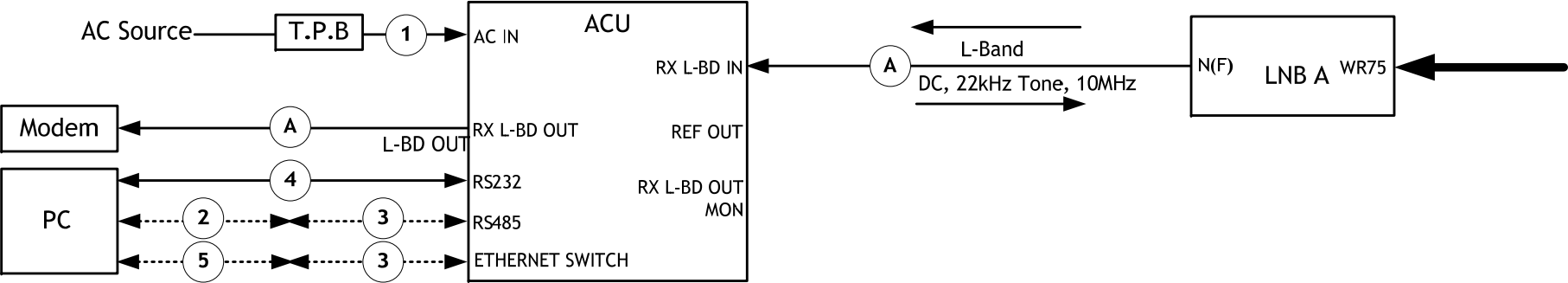
IEC 609501 – 2 <sup>nd</sup> Edition	International Safety Standard for Information Technology Equipment
ETSI EN 301 489-12	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) Standard for radio equipment and services; Part 12: Specific conditions for Very Small Aperture Terminal, Satellite Interactive Earth Stations operated in the frequency ranges between 4 GHz and 30 GHz in the fixed Satellite Service (FSS)
ETSI EN 301 489-1	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility Standard for Radio Equipment and Services
FCC Part 15 Class B	Two levels of radiation and conducted emissions limits for unintentional radiators (FCC Mark)

## Appendix D Document Revision Log

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Revision	Date	Description
A	May 2010	New Release
B	March 2012	Update Company's new logo, address, and template.
C	October 2013	Updated instruction manual contents and formatting.

Standalone LNB Configuration using ACU



LIST OF SYSTEM COMPONENTS

Agilis Part No.	Description	Quantity
ACU202R01	ACU Series Outdoor LNB Control Unit	1
-	QUAD-BAND LNB	1

**Note:** These tables list the typical accessories for this setup. Depending on your purchase order, your System Configuration package may not include certain optional items. Please contact Agilis if you wish to purchase any of the accessories.

LIST OF ACCESSORIES

Item No.	Agilis Part No.	Description	Length (m)	Quantity
1	1001520980	AC Power Cable with Transient Protection Box	2	1
2	6103480008	Converter RS485 to USB	-	1
3	2502040699	C/A M&C RS485 (optional)	-	1
4	2502040500	C/A M&C RS232	-	1
5	2502041166	C/A M&C DB9 to ETH RJ45 (optional)	-	1
A	-	RF Cable (L-Band)	To be arranged by the customer	